c- $U_0 = \frac{Q_m}{C} \Rightarrow C = \frac{Q_m}{C} \Rightarrow \frac{Q_m}{U_0} = \frac{10^{-5}}{25} \Rightarrow \underline{C = 4.10^{-7}F}$

d- $L = \frac{1}{4.10^{-7} \times 10^{6}} \Rightarrow \underline{L = 2,5H}$

e- $\frac{2E}{L} = 10^{-4} \Rightarrow E = 10^{-4} x \frac{L}{2} \Rightarrow \underline{E = 1,25.10^{-4}J}$

3°) $q(t)=Q_m \sin(\omega t+\varphi_q)$

pour $t = 0 : q(0)=Q_m \sin\varphi_q = Q_m \Rightarrow \varphi_q = \frac{\pi}{2}$ rad

$\Rightarrow q(t) = 10^{-5} \sin\left(10^3 t + \pi\right)$ (C)

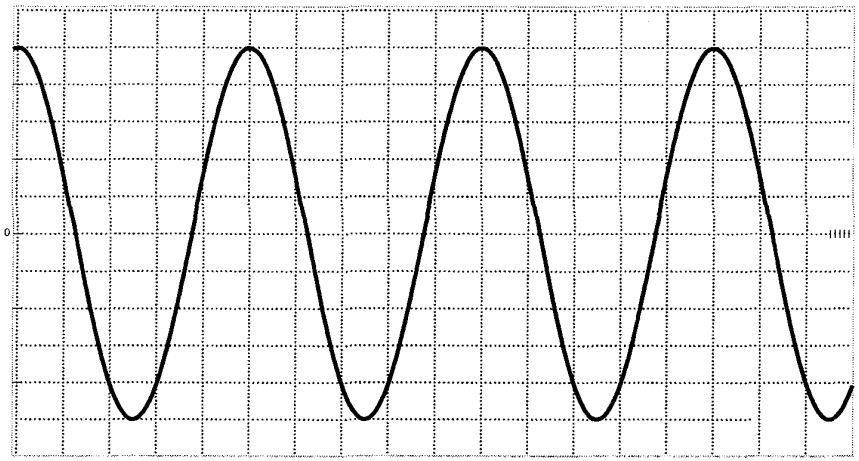
* $i = \frac{dq}{dt} \Rightarrow i(t) = 10^{-2} \sin\left(10^3 t + \pi\right)$ (A)

* $u_c = \frac{q}{c} \Rightarrow u_c(t) = 25\sin\left(10^3 t + \frac{\pi}{2}\right)$ (V)

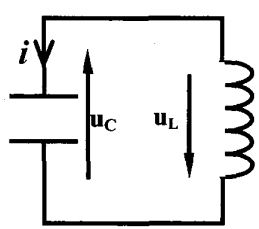
* $u_L = -u_c \Rightarrow u_L(t) = 25\sin\left(10^3 t - \frac{\pi}{2}\right)$ (V)

4) $T_0 = \frac{2\pi}{\omega_0} \Rightarrow T_0 = 2\pi ms \rightarrow 2cm$

10V → 1cm ; 25V → 2,5cm



Exercice N°11



1°) Loi des mailles : $u_c + u_L = 0$

Or $u_c = \frac{q}{c}$ et $u_L = L\frac{di}{dt} = L\frac{d^2q}{dt^2}$

$q = C.u_c$ d'ou $u_L = LC.\frac{d^2u_C}{dt^2}$

Et par suite $LC\frac{d^2u_C}{dt^2} + u_C = 0$ avec $\omega_0 = \frac{1}{\sqrt{LC}}$

L'équation différentielle admet une solution sinusoïdale de la forme :

2°)* $E = E_e + E_L$ or $E_e = \frac{q^2}{2C} = \frac{C^2u_C^2}{2C}$ et $E_e = \frac{1}{2}C.u_C^2$